

What is claimed is:

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1. A monitoring device for checking for a predefined position of a body or for checking for the presence of a body, comprising a pivotal checking element (52), a motor (20) for driving the checking element (52) and a housing (12) for accommodating the motor (20),

characterised in that a seal (68) is arranged between the checking element (52) and the housing (12) around a shaft (22) by means of which the checking element (52) is driven.

2. A monitoring device in accordance with Claim 1, characterised in that the seal (68) abuts on the checking element (52) and abuts on the housing (12).

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3. A monitoring device in accordance with Claim 1, characterised in that the seal (68) is formed symmetrically about an axis (24).

4. A monitoring device in accordance with Claim 1, characterised in that the seal (68) is seated between the checking element (52) and the housing (12) co-axially relative to the shaft (22).

5. A monitoring device in accordance with Claim 1, characterised in that an intermediate space (69) is formed between the shaft (22) and the seal (68).

6. A monitoring device in accordance with Claim 1, characterised in that the seal (68) is adapted to be rotationally fixed relative to the checking element (52).

7. A monitoring device in accordance with Claim 6, characterised in that the checking element (52) comprises a mounting element (64) for the seal (68) onto which the latter is adapted to be put in order to fix it non-rotationally on the checking element (52).

8. A monitoring device in accordance with Claim 7, characterised in that the mounting element (64) is formed by a mounting ring through which the shaft (22) is guided and onto which the seal (68) is adapted to be put.

9. A monitoring device in accordance with Claim 7, characterised in that an annular recess (66) for accommodating the seal (68) is formed between the mounting element (64) and the checking element (52).

10. A monitoring device in accordance with Claim 1, characterised in that an outer diameter of the seal (68) substantially corresponds to the diameter of the checking element (52).

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11. A monitoring device in accordance with Claim 1, characterised in that the seal (68) comprises a packing ring (70) for the purposes of putting it onto the checking element (52).

12. A monitoring device in accordance with Claim 1, characterised in that the seal (68) comprises a collar (72) having a V-shaped sealing lip (74) which abuts the housing (12).

13. A monitoring device in accordance with Claim 12, characterised in that the collar (72) is rotatable with the checking element (52) relative to the housing (12).

14. A monitoring device in accordance with Claim 12, characterised in that the outer surface (78) of the collar (72) is substantially in the form of a truncated cone at least when force is not being applied thereto in the axial direction.

15. A monitoring device in accordance with Claim 14, characterised in that an imaginary cone peak of the collar (72) points towards the checking element (52).

16. A monitoring device in accordance with Claim 14, characterised in that the inner surface (80) of the collar (72) is substantially in the form of a truncated cone at least when force is not being applied thereto in the axial direction.

17. A monitoring device in accordance with Claim 12, characterised in that an axial extent of the seal (68) can be varied by the collar (70).

18. A monitoring device in accordance with Claim 1, characterised in that a control device (50) is provided by means of which the pivotal position and/or the speed and/or the torque of the checking element (52) are controllable.

19. A monitoring device in accordance with Claim 18, characterised in that the control device (50) controls the pivotal position, the speed and the torque of the checking element (52) in combination.

20. A monitoring device in accordance with Claim 18 or 19, characterised in that the pivotal movement is controllable by the control device (50) in a manner such that the torque will lie below a predefined value (146).

21. A monitoring device in accordance with Claim 20, characterised in that the checking element (52) is adapted to be pivoted commencing from a starting position (150) through a transition region (152) into a monitoring region (144) in which the predefined position of the body lies or in which the presence of a body should be monitored, and the predefined value for the maximum permissible torque (146) in the monitoring region (144) is reduced relative to that in the transition region (142).

22. A monitoring device in accordance with Claim 20, characterised in that the motor (20) is an electric motor and the limiting of the maximum permissible torque (146) is effected by limiting the supply of current to the motor.

23. A monitoring device in accordance with Claim 21, characterised in that the speed of the checking element (52) is reducible during its transfer from the transition region (142) into the monitoring region (144).

24. A monitoring device in accordance with Claim 23, characterised in that the reduction of the maximum permissible torque (146) is effected after the reduction in the speed of the checking element (52).

25. A monitoring device in accordance with Claim 21, characterised in that the transition region (142) comprises an acceleration region (152) in which the speed of the checking element (52) is increased commencing from the starting position (150).

26. A monitoring device in accordance with Claim 21, characterised in that the transition region (142) comprises a braking region (156) in which the speed of the checking element (52) is reduced.

27. A monitoring device in accordance with Claim 21, characterised in that the speed of the checking element (52) in the transition region (142) is maintained substantially constant between an acceleration region (152) and a braking region (156) of the transition region (142).

28. A monitoring device in accordance with Claim 21, characterised in that the speed of the checking element (52) is maintained substantially constant in the monitoring region (144).

29. A monitoring device in accordance with Claim 1, characterised in that the control device (50) comprises a digital angle transmitter (38) for controlling the pivotal movement of the checking element (52).

30. A monitoring device in accordance with Claim 29, characterised in that the controlling of the speed and the torque of the checking element (52) is effected by the control device (50) by means of the time-dependent controlling of the position of the checking element (52).

31. A monitoring device in accordance with Claim 29, characterised in that the control device (50) sets the pivotal position of the checking element (52).

32. A monitoring device in accordance with Claim 29, characterised in that the control device (50) sets the speed of the checking element (52).

33. A monitoring device in accordance with Claim 30, characterised in that the control device (50) sets the pivotal position and the speed of the checking element (52).

34. A monitoring device in accordance with Claim 21, characterised in that the control device (50) is adapted to undergo a learning cycle for determining the monitoring region (144).

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35. A monitoring device in accordance with Claim 34, characterised in that the monitoring region (144) is set by the control device (50) such that it begins at a certain angular amount prior to the learnt position at which a body is detected in the learning cycle.

36. A monitoring device in accordance with Claim 1, characterised in that stop means (28, 34) are provided for limiting the pivotal movement of the checking element (52).

37. A monitoring device in accordance with Claim 36, characterised in that, for the purposes of setting a reference position (150) of the checking element (52), this is moved at a predefined speed into a stop position (150) in which corresponding stop means (28, 34) touch.

38. A monitoring device in accordance with Claim 37, characterised in that, for the purposes of defining the reference position (150) of the checking element (52) in the stop position, corresponding stop means (28, 34) are rotated against each other at low torque.

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